

WHAT IS CLAIMED IS:

1 1. A gear-reduction device for measuring and
2 transmitting rotary and swivel movements, comprising a plurality
3 of wheel/pinion pairs, each wheel/pinion pair having a gear
4 axle, a gear wheel and a pinion gear, the gear wheel and the
5 pinion gear being rigidly connected to the gear axle; said gear-
6 reduction device being adapted to be coupled to a rotary object
7 that moves in a plane of rotation and whose movement is to be
8 measured within a measuring range; and said gear-reduction
9 device producing an output motion that is reduced in relation to
10 the movement of the rotary object, thereby expanding the
11 measuring range; wherein

12 the gear wheels of the different wheel/pinion pairs lie
13 in different gear-wheel planes, at least a part of the gear-
14 wheel planes being parallel to each other and inclined in
15 relation to the plane of rotation of the rotary object;

16 the gear wheels of the different wheel/pinion pairs are
17 of equal diameter;

18 the wheel/pinion pairs follow each other in a sequence
19 where the pinion gear of each wheel/pinion pair is engaged in
20 the gear wheel of the next following wheel/pinion pair;

21 the gear wheel of the first wheel/pinion pair in the
22 sequence is the input wheel, being positively engaged and driven
23 by the rotary object; and

24 the gear wheel of the last wheel/pinion pair in the
25 sequence is the output wheel, the pinion of the last
26 wheel/pinion pair being adapted to positively engage and drive
27 an optical angle-measuring device adapted for rotary swivel
28 motion in a swivel-motion plane.

1 2. The gear-reduction device of claim 1, wherein the
2 gear-wheel plane of the input wheel is parallel to the plane of
3 rotation of the rotary object.

1 3. The gear-reduction device of claim 1, wherein the
2 gear-wheel plane of the output wheel is parallel to the swivel-
3 motion plane of the optical angle-measuring device.

1 4. The gear-reduction device of claim 1, wherein all
2 gear-wheel planes are parallel to each other and inclined at an
3 oblique angle in relation to the plane of rotation of the rotary
4 object.

1 5. The gear-reduction device of claim 1, wherein the
2 input wheel has an input shaft and is kinematically coupled to a
3 driving unit, and the output wheel has a central output shaft
4 adapted to transmit movement to a driven device.

1 6. The gear-reduction device of claim 5, further

2 comprising a base plate, a cover plate, and a plurality of
 3 rotary bearings mounted in the base plate and the cover plate,
 4 wherein at least the input shaft and the central output shaft
 5 run in the rotary bearings and wherein further the gear-
 6 reduction device is adapted to be flange-mounted on the driving
 7 unit and to form a unitary module with the driving unit.